



SEQUENCE LISTING

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ZAZZERONI, FRANCESCA
PAPA, SALVATORE

<120> METHODS AND COMPOSITIONS FOR MODULATING APOPTOSIS

<130> 21459-94575

<140> 10/626,905

<141> 2003-07-25

<150> PCT/US02/31548

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<150> 60/328,811

<151> 2001-10-12

<150> 60/326,492

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<160> 53

<170> PatentIn Ver. 3.2

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<212> DNA

<213> Homo sapiens

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 <213> Homo sapiens

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 20 25 30
 Gln Asp Arg Leu Thr Val Gly Val Tyr Glu Ser Ala Lys Leu Met Asn
 35 40 45
 Val Asp Pro Asp Ser Val Val Leu Cys Leu Leu Ala Ile Asp Glu Glu
 50 55 60
 Glu Glu Asp Asp Ile Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ser
 65 70 75 80
 Phe Cys Cys Asp Asn Asp Ile Asn Ile Val Arg Val Ser Gly Asn Ala
 85 90 95
 Arg Leu Ala Gln Leu Leu Gly Glu Pro Ala Glu Thr Gln Gly Thr Thr
 100 105 110
 Glu Ala Arg Asp Leu His Cys Leu Pro Phe Leu Gln Asn Pro His Thr
 115 120 125
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 <212> DNA
 <213> Mus musculus

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<212> PRT
<213> Mus musculus

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Gln Ala Val Thr Ala Ala Val Glu Gln Leu Leu Val Ala Ala Gln Arg
      20             25             30

Gln Asp Arg Leu Thr Val Gly Val Tyr Glu Ala Ala Lys Leu Met Asn
      35             40             45

Val Asp Pro Asp Ser Val Val Leu Cys Leu Leu Ala Ile Asp Glu Glu
      50             55             60

Glu Glu Asp Asp Ile Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ser
      65             70             75             80

Phe Cys Cys Asp Asn Asp Ile Asp Ile Val Arg Val Ser Gly Met Gln
      85             90             95

Arg Leu Ala Gln Leu Leu Gly Glu Pro Ala Glu Thr Leu Gly Thr Thr
      100            105            110

Glu Ala Arg Asp Leu His Cys Leu Leu Val Thr Asn Cys His Thr Asp
      115            120            125

Ser Trp Lys Ser Gln Gly Leu Val Glu Val Ala Ser Tyr Cys Glu Glu
      130            135            140

Ser Arg Gly Asn Asn Gln Trp Val Pro Tyr Ile Ser Leu Glu Glu Arg
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<210> 5
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<212> DNA
<213> Homo sapiens

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cggctggcac aggaggagga gcccgggcgg gcgagggggc gccggagagc gccagggcct 180
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<210> 6
 <211> 165
 <212> PRT
 <213> Mus musculus

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Asp Lys Val Gly Asp Ala Leu Glu Glu Val Leu Ser Lys Ala Leu Ser
      20              25              30

Gln Arg Thr Ile Thr Val Gly Val Tyr Glu Ala Ala Lys Leu Leu Asn
      35              40              45

Val Asp Pro Asp Asn Val Val Leu Cys Leu Leu Ala Ala Asp Glu Asp
      50              55              60

Asp Asp Arg Asp Val Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ala
      65              70              75              80

Phe Cys Cys Glu Asn Asp Ile Asn Ile Leu Arg Val Ser Asn Pro Gly
      85              90              95

Arg Leu Ala Glu Leu Leu Leu Leu Glu Thr Asp Ala Gly Pro Ala Ala
      100             105             110

Ser Glu Gly Ala Glu Gln Pro Pro Asp Leu His Cys Val Leu Val Thr
      115             120             125

Asn Pro His Ser Ser Gln Trp Lys Asp Pro Ala Leu Ser Gln Leu Ile
      130             135             140

Cys Phe Cys Arg Glu Ser Arg Tyr Met Asp Gln Trp Val Pro Val Ile
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Asn Leu Pro Glu Arg
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<210> 7
<211> 1224
<212> DNA
<213> Mus musculus

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caggagcagc ccgcgcgcgc agggaggggac tcgcacttgc aatatgactt tggaggaatt 180
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<212> PRT
<213> Mus musculus

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Asp Thr Val Gly Asp Ala Leu Glu Glu Val Leu Ser Lys Ala Arg Ser
20 25 30
Gln Arg Thr Ile Thr Val Gly Val Tyr Glu Ala Ala Lys Leu Leu Asn
35 40 45
Val Asp Pro Asp Asn Val Val Leu Cys Leu Leu Ala Ala Asp Glu Asp
50 55 60
Asp Asp Arg Asp Val Ala Leu Gln Ile His Phe Thr Leu Ile Arg Ala
65 70 75 80
Phe Cys Cys Glu Asn Asp Ile Asn Ile Leu Arg Val Ser Asn Pro Gly
85 90 95

Arg Leu Ala Glu Leu Leu Leu Leu Glu Asn Asp Ala Gly Pro Ala Glu
 100 105 110

Ser Gly Gly Ala Ala Gln Thr Pro Asp Leu His Cys Val Leu Val Thr
 115 120 125

Asn Pro His Ser Ser Gln Trp Lys Asp Pro Ala Leu Ser Gln Leu Ile
 130 135 140

Cys Phe Cys Arg Glu Ser Arg Tyr Met Asp Gln Trp Val Pro Val Ile
 145 150 155 160

Asn Leu Pro Glu Arg
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<210> 9
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 <213> Homo sapiens

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 20 25 30

Ala Gln Arg Gln Gly Cys Leu Thr Ala Gly Val Tyr Glu Ser Ala Lys
 35 40 45

Val Leu Asn Val Asp Pro Asp Asn Val Thr Phe Cys Val Leu Ala Ala
 50 55 60

Gly Glu Glu Asp Glu Gly Asp Ile Ala Leu Gln Ile His Phe Thr Leu
 65 70 75 80

Ile Gln Ala Phe Cys Cys Glu Asn Asp Ile Asp Ile Val Arg Val Gly
 85 90 95

Asp Val Gln Arg Leu Ala Ala Ile Val Gly Ala Gly Glu Glu Ala Gly
 100 105 110

Ala Pro Gly Asp Leu His Cys Ile Leu Ile Ser Asn Pro Asn Glu Asp
 115 120 125

Ala Trp Lys Asp Pro Ala Leu Glu Lys Leu Ser Leu Phe Cys Glu Glu
 130 135 140

Ser Arg Ser Val Asn Asp Trp Val Pro Ser Ile Thr Leu Pro Glu
 145 150 155

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 <212> DNA
 <213> Mus musculus

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 <213> Mus musculus

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Ala Arg Met Gln Gly Ala Gly Lys Ala Leu His Glu Leu Leu Leu Ser
 20 25 30

Ala His Gly Gln Gly Cys Leu Thr Ala Gly Val Tyr Glu Ser Ala Lys
 35 40 45

Val Leu Asn Val Asp Pro Asp Asn Val Thr Phe Cys Val Leu Ala Ala
 50 55 60

Asp Glu Glu Asp Glu Gly Asp Ile Ala Leu Gln Ile His Phe Thr Leu
 65 70 75 80

Ile Gln Ala Phe Cys Cys Glu Asn Asp Ile Asp Ile Val Arg Val Gly
 85 90 95

Asp Val Gln Arg Leu Ala Ala Ile Val Gly Ala Asp Glu Glu Gly Gly
 100 105 110

Ala Pro Gly Asp Leu His Cys Ile Leu Ile Ser Asn Pro Asn Glu Asp
 115 120 125

Thr Trp Lys Asp Pro Ala Leu Glu Lys Leu Ser Leu Phe Cys Glu Glu
 130 135 140

Ser Arg Ser Phe Asn Asp Trp Val Pro Ser Ile Thr Leu Pro Glu
 145 150 155

<210> 13

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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33

<210> 14

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 14

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40

<210> 15

<211> 22

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

 <400> 15
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 <210> 16
 <211> 39
 <212> DNA
 <213> Artificial Sequence

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 <223> Description of Artificial Sequence: Primer

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 <210> 17
 <211> 41
 <212> DNA
 <213> Artificial Sequence

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 <210> 18
 <211> 38
 <212> DNA
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 <210> 19
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<213> Artificial Sequence

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<213> Artificial Sequence

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41

<210> 22

<211> 39

<212> DNA

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39

<210> 23

<211> 39

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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<210> 24

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 24

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38

<210> 25
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 25
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<210> 26
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 26
tagggactct cc 12

<210> 27
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 27
aatattctct cc 12

<210> 28
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 28
ggggattcca 10

<210> 29
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 29
atcgattcca 10

<210> 30
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 30
 ggaaaccccg 10

<210> 31
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<220>
 <223> Description of Artificial Sequence: Primer

<400> 31
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<210> 32
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<220>
 <223> Description of Artificial Sequence: Primer

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<210> 33
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<220>
 <223> Description of Artificial Sequence: Primer

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<210> 34
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27

<210> 35

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<212> DNA

<213> Mus musculus

<400> 35

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<212> DNA
<213> Mus musculus

<400> 36
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<210> 37
<211> 16
<212> DNA
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<400> 37
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<210> 38
<211> 10
<212> DNA
<213> Mus musculus

<400> 38
ggggattcca 10

<210> 39
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<400> 39
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<400> 40
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<210> 41
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<400> 41
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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Synthetic peptide

<400> 42
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<210> 43
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<212> PRT
<213> Artificial Sequence

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<210> 44
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
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Val Glu Ile Asp
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<210> 45
<211> 4
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<213> Artificial Sequence

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Ile Glu Thr Asp
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<210> 46
<211> 4
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 46

Leu Glu His Asp

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<210> 47

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 47

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<210> 48

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 48

gtacaagggt atggctatgt caatgggagg tag

33

<210> 49

<211> 1392

<212> DNA

<213> Homo sapiens

<400> 49

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| gtggcgggcg | ggaagatggc | ggcgtcctcc | ctggaacaga | agctgtcccg | cctggaagca | 120 |
| aagctgaagc | aggagaaccg | ggaggcccg | cggaggatcg | acctcaacct | ggatatcagc | 180 |
| ccccagcggc | ccaggcccac | cctgcagctc | ccgctggcca | acgatggggg | cagccgctcg | 240 |
| ccatcctcag | agagctcccc | gcagcacccc | acgccccccg | cccggccccg | ccacatgctg | 300 |
| gggtccccgt | caaccctgtt | cacacccccg | agcatggaga | gcattgagat | tgaccacaag | 360 |
| ctgcaggaga | tcatgaagca | gacgggctac | ctgaccatcg | ggggccagcg | ctaccaggca | 420 |
| gaaatcaacg | acctggagaa | cttggggcag | atgggcagcg | gcacctgcgg | accggtgtgg | 480 |
| aagatgcgct | tccggaagac | cggccacgtc | attgccgtta | agcaaatacg | gcgctccggg | 540 |
| aacaaggagg | agaacaagcg | catcctcatg | gacctggatg | tggtgctgaa | gagccacgac | 600 |
| tgcccctaca | tcgtgcagtg | ctttgggacg | ttcatcacca | acacggacgt | cttcacgcgc | 660 |
| atggagctca | tgggcacctg | cgctgagaag | ctcaagaagc | ggatgcaggg | cccatcccc | 720 |
| gagcgcattc | tgggcaagat | gacagtggcg | attgtgaagg | cgctgtacta | cctgaaggag | 780 |
| aagcacggtg | tcatccaccg | cgacgtcaag | ccctccaaca | tcctgctgga | cgagcggggc | 840 |
| cagatcaagc | tctgcgactt | cggcatcagc | ggcgccctgg | tggactccaa | agccaagacg | 900 |
| cggagcgccg | gctgtgccgc | ctacatggca | cccagagcgca | ttgaccccc | agacccacc | 960 |
| aagccggact | atgacatccg | ggccgacgta | tggagcctgg | gcattctcgt | ggtggagctg | 1020 |


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<210> 50
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<212> PRT
<213> Homo sapiens

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Asp Ile Ser Pro Gln Arg Pro Arg Pro Thr Leu Gln Leu Pro Leu Ala
          35          40          45

Asn Asp Gly Gly Ser Arg Ser Pro Ser Ser Glu Ser Ser Pro Gln His
          50          55          60

Pro Thr Pro Pro Ala Arg Pro Arg His Met Leu Gly Leu Pro Ser Thr
          65          70          75          80

Leu Phe Thr Pro Arg Ser Met Glu Ser Ile Glu Ile Asp His Lys Leu
          85          90          95

Gln Glu Ile Met Lys Gln Thr Gly Tyr Leu Thr Ile Gly Gly Gln Arg
          100          105          110

Tyr Gln Ala Glu Ile Asn Asp Leu Glu Asn Leu Gly Glu Met Gly Ser
          115          120          125

Gly Thr Cys Gly Pro Val Trp Lys Met Arg Phe Arg Lys Thr Gly His
          130          135          140

Val Ile Ala Val Lys Gln Met Arg Arg Ser Gly Asn Lys Glu Glu Asn
          145          150          155          160

Lys Arg Ile Leu Met Asp Leu Asp Val Val Leu Lys Ser His Asp Cys
          165          170          175

Pro Tyr Ile Val Gln Cys Phe Gly Thr Phe Ile Thr Asn Thr Asp Val
          180          185          190

Phe Ile Ala Met Glu Leu Met Gly Thr Cys Ala Glu Lys Leu Lys Lys
          195          200          205

Arg Met Gln Gly Pro Ile Pro Glu Arg Ile Leu Gly Lys Met Thr Val
          210          215          220

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Ala Ile Val Lys Ala Leu Tyr Tyr Leu Lys Glu Lys His Gly Val Ile
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 His Arg Asp Val Lys Pro Ser Asn Ile Leu Leu Asp Glu Arg Gly Gln
 245 250 255
 Ile Lys Leu Cys Asp Phe Gly Ile Ser Gly Arg Leu Val Asp Ser Lys
 260 265 270
 Ala Lys Thr Arg Ser Ala Gly Cys Ala Ala Tyr Met Ala Pro Glu Arg
 275 280 285
 Ile Asp Pro Pro Asp Pro Thr Lys Pro Asp Tyr Asp Ile Arg Ala Asp
 290 295 300
 Val Trp Ser Leu Gly Ile Ser Leu Val Glu Leu Ala Thr Gly Gln Phe
 305 310 315 320
 Pro Tyr Lys Asn Cys Lys Thr Asp Phe Glu Val Leu Thr Lys Val Leu
 325 330 335
 Gln Glu Glu Pro Pro Leu Leu Pro Gly His Met Gly Phe Ser Gly Asp
 340 345 350
 Phe Gln Ser Phe Val Lys Asp Cys Leu Thr Lys Asp His Arg Lys Arg
 355 360 365
 Pro Lys Tyr Asn Lys Leu Leu Glu His Ser Phe Ile Lys Arg Tyr Glu
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Thr

<210> 51

<211> 2313

<212> DNA

<213> Mus musculus

<400> 51

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<210> 52

<211> 346

<212> PRT

<213> Mus musculus

<400> 52

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Ile Glu Ile Asp Gln Lys Leu Gln Glu Ile Met Lys Gln Thr Gly Tyr
      20             25             30

Leu Thr Ile Gly Gly Gln Arg Tyr Gln Ala Glu Ile Asn Asp Leu Glu
      35             40             45

Asn Leu Gly Glu Met Gly Ser Gly Thr Cys Gly Gln Val Trp Lys Met
      50             55             60

Arg Phe Arg Lys Thr Gly His Ile Ile Ala Val Lys Gln Met Arg Arg
      65             70             75             80

Ser Gly Asn Lys Glu Glu Asn Lys Arg Ile Leu Met Asp Leu Asp Val
      85             90             95

Val Leu Lys Ser His Asp Cys Pro Tyr Ile Val Gln Cys Phe Gly Thr
      100            105            110

Phe Ile Thr Asn Thr Asp Val Phe Ile Ala Met Glu Leu Met Gly Ile
      115            120            125

Cys Ala Glu Lys Leu Lys Lys Arg Met Gln Gly Pro Ile Pro Glu Arg
      130            135            140

```

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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| Lys | Glu | Lys | His | Gly | Val | Ile | His | Arg | Asp | Val | Lys | Pro | Ser | Asn | Ile |
| | | | 165 | | | | | | 170 | | | | | 175 | |
| Leu | Leu | Asp | Glu | Arg | Gly | Gln | Ile | Lys | Leu | Cys | Asp | Phe | Gly | Ile | Ser |
| | | 180 | | | | | | 185 | | | | | 190 | | |
| Gly | Arg | Leu | Val | Asp | Ser | Lys | Ala | Lys | Thr | Arg | Ser | Ala | Gly | Cys | Ala |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Ala | Tyr | Met | Ala | Pro | Glu | Arg | Ile | Asp | Pro | Pro | Asp | Pro | Thr | Lys | Pro |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Asp | Tyr | Asp | Ile | Arg | Ala | Asp | Val | Trp | Ser | Leu | Gly | Ile | Ser | Leu | Val |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Glu | Leu | Ala | Thr | Gly | Gln | Phe | Pro | Tyr | Lys | Asn | Cys | Lys | Thr | Asp | Phe |
| | | | 245 | | | | | | 250 | | | | | 255 | |
| Glu | Val | Leu | Thr | Lys | Val | Leu | Gln | Glu | Glu | Pro | Pro | Leu | Leu | Pro | Gly |
| | | 260 | | | | | | 265 | | | | | | 270 | |
| His | Met | Gly | Phe | Ser | Gly | Asp | Phe | Gln | Ser | Phe | Val | Lys | Asp | Cys | Leu |
| | 275 | | | | | | 280 | | | | | 285 | | | |
| Thr | Lys | Asp | His | Arg | Lys | Arg | Pro | Lys | Tyr | Asn | Lys | Leu | Leu | Glu | His |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Ser | Phe | Ile | Lys | His | Tyr | Glu | Ile | Leu | Glu | Val | Asp | Val | Ala | Ser | Trp |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Phe | Lys | Asp | Val | Met | Ala | Lys | Thr | Asp | Ser | Pro | Arg | Thr | Ser | Gly | Val |
| | | | 325 | | | | | | 330 | | | | | 335 | |
| Leu | Ser | Gln | His | His | Leu | Pro | Phe | Phe | Arg | | | | | | |
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<210> 53

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
6X-His tag

<400> 53

His His His His His His

1

5